CLIMATE CHANGE AND DISASTER SCIENCE IN THE PHILIPPINE SETTING

WHAT IS "CLIMATE CHANGE," AND HOW DO WE MANAGE IT? WHAT IS APPROPRIATE ACTION FOR THE PHILIPPINE SETTING? These questions, though succinct enough, harbor a complex history behind them. And, the answers are not at all straightforward. Any scientist will acknowledge that earth's climate has always been changing, as witnessed by the procession of ice ages and interglacial periods in the recent history of the planet. However, what is at issue now is whether *human impact* has been so significant as to influence the *rate* at which the climate has been changing. The debate has been heated, and continues to simmer. There is a school of thought, probably now the dominant one worldwide, that maintains that increasing emissions into the atmosphere of carbon dioxide and other greenhouse gases (such as methane, even water vapor) have created the so-called planetary "greenhouse effect," leading to overall global warming. But there is also compelling evidence that it is the intensity of solar radiation that correlates positively with global warming, providing an alternative view to the carbon dioxide-greenhouse interpretation.

Nevertheless, some consensus has been arrived at with respect to the following: sea surface temperatures have indeed risen significantly since reliable recording instruments were put in place; some parts of the global ocean have exhibited declining pH within a span of decades (suggesting so-called "ocean acidification"); and – rather ominously – the amount of Arctic sea ice has dwindled appreciably over the years. The latter observation was contributed by, among others, a Philippine scientist working out of the US National Aeronautics and Space Administration (NASA), Josefino Comiso, who has used satellite images to document the phenomenon. Other studies published in influential journals such as *Nature* project that ocean surface warming will result in increasing frequency of more severe hurricanes.

What does all this signify for a tiny tropical country like the Philippines, situated on the western border of the vast Pacific Ocean? The popular media has imbibed and propagated what sound like dire warnings from scientists, from here and abroad. Sea level will rise by several meters by the end of the century, threatening to inundate low-lying coastal areas. The frequency of violent storms will increase. There will be more prolonged periods of drought, interspersed with episodes of heavier rainfall than has occurred in the past. Unfortunately, government decision-makers cannot make much use of such sweeping declarations of impending catastrophe, no matter the degree of truth contained in them. Could this be the reason why the public at large has become somewhat jaded about categorical pronouncements from scientists? This is not helped by the fact that broad publicity about "global warming" in the United States and Europe has been followed, practically on its heels, by some of the harshest winters on record within recent memory.

Regardless of the complexities that pervade the climate change debate, there do exist certainties regarding the Philippine situation. The country is located in an extremely vulnerable physical setting. It is visited by typhoons at an average of twenty (20) per year. It sits exactly on the site of subduction of the Pacific plate, on its eastern flank, a cause for large-magnitude earthquakes. Not to mention that the Philippines was the stage for the most spectacular volcanic eruption of the century (Mount Pinatubo), with even more volcanoes along its length emitting signs of activity. The country, therefore, is highly disaster-prone. The expected effects of a rapidly changing climate will only exacerbate this situation.

As the well-worn adage goes, "Prevention is better than cure." As we scramble to get our act together – from the government, the private sector, the academe, all the way down to the man on the street – we are suddenly confronted with a sobering reality. This pertains to the dearth of scientific knowledge appropriate to the Philippine setting. This fact was revealed, for example, by a recent exercise within the University of the Philippines system to compile studies related to the environment, including disaster management. For truly reliable scientific information, one looks first to the primary literature, the peer-reviewed scientific journals. Failing that, one then has to resort to technical reports, the so-called "grey literature,"

issued by various government agencies, academic institutions, and NGO's. But how reliable would these be, if they have not been properly "vetted" by experts in the relevant fields, so to speak?

With every major disaster in the Philippines, casualties easily run into the *thousands*, not to mention ruined lives and damage to property. There is clearly an urgent need to identify vulnerable areas throughout the country that require immediate *resettlement* of human communities, in order to prevent such catastrophic loss of life in the future. This calls for *multidisciplinary* studies on climate, geology, the ecology of natural habitats, their restoration; not to forget agriculture and fisheries, all the way to redesigning urban settlements. In addition, economic *cost-benefit analyses* of preventing future disasters need to be conducted, in order to convince local government officials that they stand to "save more money" in the long run by relocating people and saving lives, rather than dealing with the aftermath of disasters, as is the usual sorry case now – cleaning up, rebuilding institutions and establishments, burying the dead. In this respect, one dimension that seems to be completely overlooked is the psychological trauma that lingers within the affected population, and that exacts a hidden but enormous cost on the continued ability of a society to function.

Additional suggestions have been put forward for a more proactive approach in the Philippines. Scientists can take the lead but their role is obviously limited. Therefore, an engaged and well-informed citizenry must be cultivated in tandem. This emphasizes the long-term importance of education, good governance, an effective media to disseminate public information, and the critical cooperation of local government units (LGUs). Successful municipalities in this regard could be recognized as models that can then be replicated throughout the country.

Isn't it high time that our Filipino scientists take a more active stand on this issue, rather than leave the major responsibility to civic groups (who may be well-meaning but do not necessarily possess the requisite expertise) and the popular media?

Helen T. Yap, PhD
February 29, 2012